

ELECTRONIC FILING

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant	: Andrea Caserta et al.		
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Commissioner for Patents  
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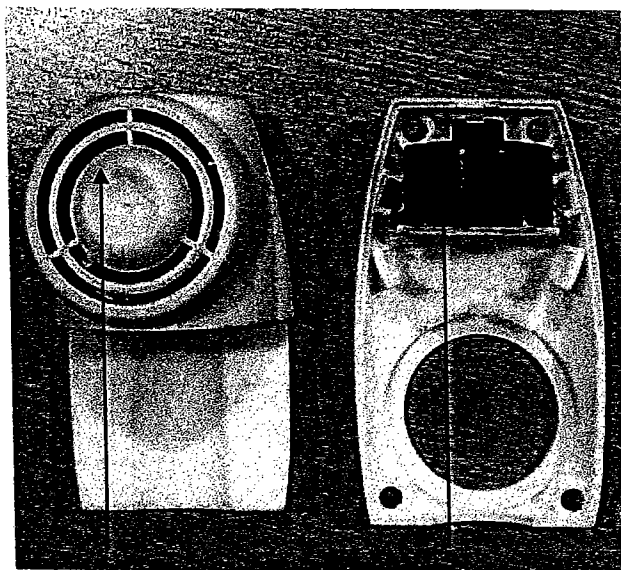
**DECLARATION OF CEDRIC MORHAIN, PH.D.**

I, Cédric Morhain, Ph.D., do hereby declare as follows:

I am an employee by the Assignee of the above-identified United States Patent Application nº 10/519.424, Zobeles España, S.A. I am making this declaration in support of the patentability of the claims of the subject application. I have been employed since January 2001 as a Research Engineer in the Research and Development Department of Zobeles España S.A., in Cerdanyola del Valles, Spain wherein my duties relate to the conception and development of innovative concepts for the controlled release of volatile substance, such as perfume or insecticides, in the ambient. Although I was not the person in charge of the development of the invention claimed in the present application, I have collaborated to this project. Prior to my employment by Zobeles España, S.A., I was working in the Catalan Centre of Plastics, located in Terrassa, Spain where I carry out in addition to the research tasks corresponding to my PhD development activities for external companies.

I received my Master Degree in Physics and Applications from the University of Nancy I, located in Nancy, France in 1993. Subsequently, I received a Diploma of Engineer in Material Engineering from the Institut Polytechnique de Lorraine, located in Nancy, France in 1996. Finally, I was accorded a Doctorate degree in Industrial Engineering from The Universidad Politécnica de Cataluña of Barcelona, Spain in 2001. In accordance with the educational and professional experience detailed above, I submit that I am an artisan of at least ordinary skill in the field of the present invention.

The data submitted are extracted from the preliminary testing carried out during the project to check the technical feasibility of the concept. Testing was performed in-house by technical personal of R&D laboratory.



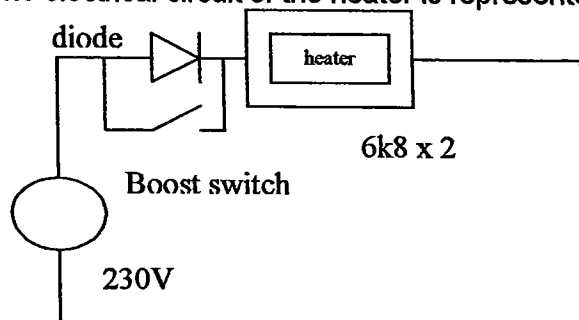
FAN

HEATER

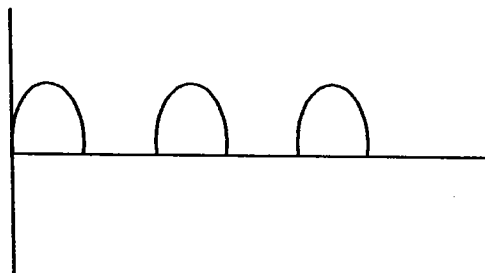
Front and rear elements of  
the used prototype.

The first prototype used for this testing was constructed in a different way than the final product as it was obtained from a standard heater device (in order to not have to produce new moulding tools), but the different heat impulses were obtained by changing electrical inputs.

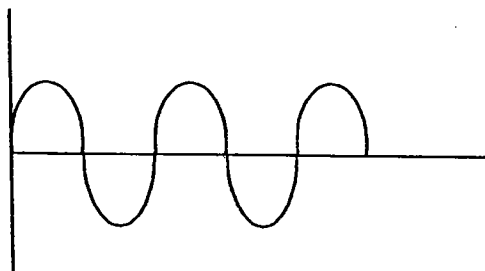
The electrical circuit of the heater is represented in the drawing below:



The different heating statuses were obtained by closing or opening the boost switch: When Boost switch is opened heater receives a rectified signal. In this case heater working temperature is lower.



When Boost switch is closed, heater receives the complete signal. In this case heater working temperature is higher.



As experts in electrical heaters for evaporating volatile substance, we consider this configuration completely equivalent, in a point of view of heat transfer toward the wick, to the independents two resistors described in the above-mentioned Patent Application.

The temperature of the wick was measured using in-house designed laboratory tool, which simulate the geometry of a wick but where upper part is a copper based cylinder

of dimensions equivalent to that of the real wick evaporation area and is coupled to a K-type thermocouple. K-thermocouple is connected to a computer and temperature is registered as a function of time.

The effects of the combination of the additional heat and the acceleration of the speed of the fan, can be observed in the attached experimental text. For this purpose, the effect of the fan has been tested independently from the boost heating effect, although in the boost effect defined in the independent claim the acceleration of the fan is simultaneous to the boost effect.

In the attached diagram, the wick temperature has been indicated in four particular combinations of the status of the boost mode and the fan:

Condition 1.1 Boost switch opened (disconnected) and fan stopped. This situation corresponds to the normal operation of the device, wherein the wick temperature is 74°C.

Condition 1.2. Boost switch closed (connected) and fan working at 12 Volts (2300 rpm), wick temperature 49°C. The boost mode is activated so that an additional amount of heat is emitted and the fan is accelerated. Even if there is an increase in the heat emitted towards the wick, the wick temperature falls (even below the temperature at normal operation) due to the flow of air through the wick.

Condition 1.3. Boost switch closed (connected) and fan working at 8 Volts (2000 rpm), wick temperature 71°C. The wick temperature is increased because the flow of air through the wick is decreased.

Condition 1.4: Boost switch closed and fan stopped. The wick temperature is increased even more because the flow of air is stopped. The wick temperature reaches 120°C and under this condition the volatile substance and even the wick deteriorate quickly. This condition correspond to the device described in Vieira or in the device obtained by the combination of Demarest and Vieira.

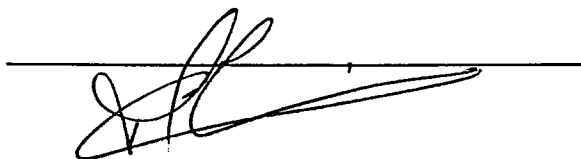
Condition 1.5: Boost switch closed and fan working at 6 V (1300 rpm). Wick temperature 91.5 °C. Again, the connection of the fan causes the wick temperature to fall.

From the above experimental results, it is clear that the air flow created by the fan has a great influence on the wick temperature, for that in the present invention the boost mode is a combination of heat and air-flow increase.

The undersigned declarant declares further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 13<sup>th</sup> day of June, 2007

Cédric Morhain, PhD



## REPORT

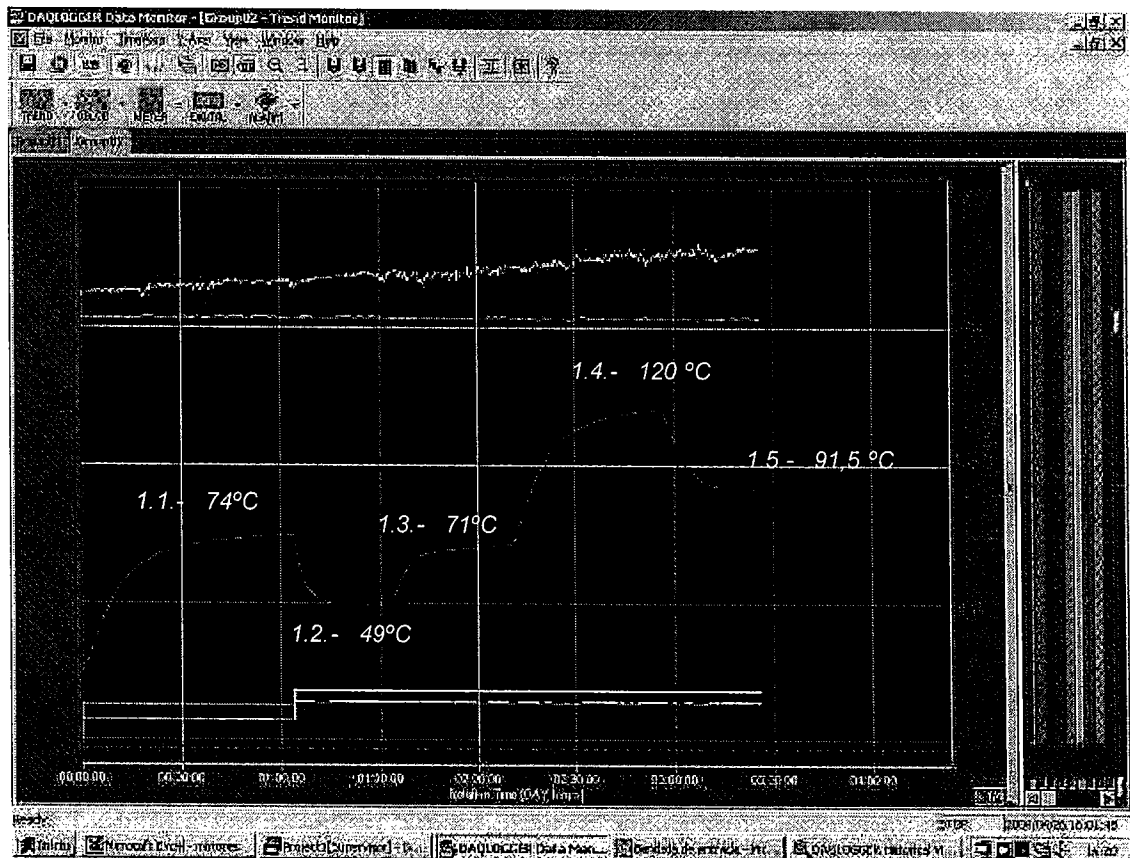
PT001

### Temperature results at 230V:

- 1.1 Boost Switch opened fan stopped.
- 1.2 Boost Switch closed fan working at 12V (2300 rpm)
- 1.3 Boost Switch closed fan working at 8V (2000 rpm)
- 1.4 Boost Switch closed fan stopped.
- 1.5 Boost Switch closed fan working at 6V (1300 rpm)

### Heater Power consumption at 230V:

- 1.1 test: 2.21 W
- 1.2 to 1.5 test: 4.18 W > 2W x 2 (resistor power consumption is over the maximum permitted)



Issued by: X.Estarellas	Checked by:	Approved by:
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